



(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

06.05.1999 Bulletin 1999/18

(51) Int Cl⁶ A44B 18/00

(21) Application number: 98308837.8

(22) Date of filing: 28.10.1998

(84) Designated Contracting States:

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE

Designated Extension States:

AL LT LV MK RO SI

(30) Priority: 31.10.1997 JP 300858/97

(71) Applicant: UNI-CHARM CORPORATION

Kawano-shi Ehime-ken (JP)

(72) Inventors:

- Tsuji, Tomoko,
c/o Research & Development Division
Mitoyo-gun, Kanagawa-ken, 769-1602 (JP)
- Takai, Hisashi, c/o Res. & Development Division
Mitoyo-gun, Kanagawa-ken, 769-1602 (JP)

(74) Representative: Parry, Christopher Stephen

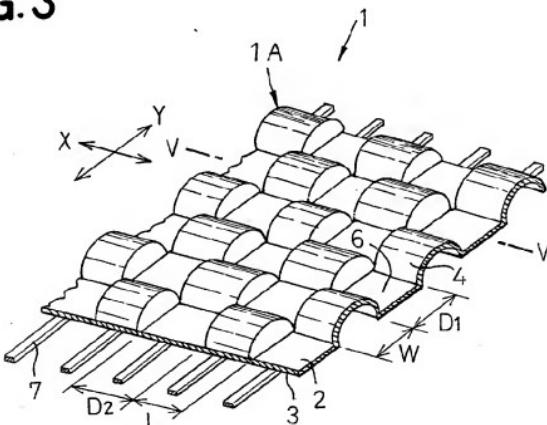
Saunders & Doleymore,
9 Rickmansworth Road
Watford, Herts. WD1 7HE (GB)

(54) Female member of mechanical fastener

(57) A female member 1 of a mechanical fastener includes a fibrous layer and a plurality of strips 7. A plurality of ridges 4 are intermittently shaped from a bottom side 3 toward a top side 2 of the fibrous layer. A plurality of strips 7 are bonded to the bottom side 3 of the fibrous

layer so as to be spaced one from another and extend in parallel one to another in one direction so that the bottom side 3 of the fibrous layer is spaced toward the top side 2 of the fibrous layer from the respective strips along the respective ridges 4.

FIG. 3



Description

[0001] This invention relates to a female member of a mechanical fastener consisting a pair of male and female members adapted to be releasably engaged with each other.

[0002] Japanese Patent Application Disclosure Gazette (Kokai) No. Hei2-18036 discloses an example of such a female member, in which a fibrous layer having a fineness of 1 ~ 10 d and a basis weight of 5 ~ 200 g/m² is laminated on a plastic film having a thickness of approximately 0.025 ~ 0.13 mm and in which the fibrous layer form a corrugated structure. In this corrugated structure, regions of the fibrous layer projecting from the plastic film engageably receive a male member (referred to also as a hook member) of the mechanical fastener.

[0003] When an article to which the mechanical fastener is attached includes clothes and other garments such as diapers, it is often desired that at least one of the female and male members is as soft as possible to avoid a problem that this member might irritate a wearer's skin. Sometimes, it is also desired for this member to have a sufficiently low rigidity to allow clothes or the like to which this member is attached to be easily deformed. Such requirement should be met particularly when the mechanical fastener is employed in disposable diapers for babies. However, with the conventional female member as described above, the fibrous layer forming the corrugated structure might lose its initial softness and become rigid due to the presence of the plastic film.

[0004] In view of the above problem, it is an object of the invention to improve a softness of the conventional mechanical fastener consisting of a plastic film and a fibrous layer.

[0005] According to the invention, there is provided a female member of a mechanical fastener consisting of a pair of male and female members adapted to be releasably engaged with each other, wherein: a region of the female member for engagement with the male member is formed by a fibrous layer of thermoplastic synthetic fibers and has top and bottom sides; and a plurality of thermoplastic synthetic resin strips are bonded to the bottom side of the fibrous layer so as to extend in parallel one to another in one direction and a plurality of ridges are shaped from the bottom side toward the top side of the fibrous layer intermittently in the one direction so that the bottom side of the fibrous layer is spaced toward the top side of the fibrous layer from the strips.

[0006] According to one of preferred embodiments of the invention, the ridges are arranged intermittently also in a direction orthogonal to the one direction.

[0007] According to another embodiment of the invention, the ridges extend continuously in a direction orthogonal to the one direction.

[0008] According to still another embodiment of the invention, the fibrous layer is made of crimped conjugat-

ed fibers.

[0009] According to further another embodiment of the invention, the fibrous layer presents a corrugated structure having the strips bonded to the bottom thereof side along respective trough-like portions thereof.

[0010] According to still further another embodiment of the invention, the fibrous layer is made of a nonwoven fabric.

10 Fig. 1 is a perspective view depicting an embodiment of female member according to the invention as a component of a mechanical fastener as viewed from above;

15 Fig. 2 is a perspective view depicting the female member depicted by Fig. 1 as viewed from below; Fig. 3 is a view similar to Fig. 1 depicting a variant of the female member depicted by Fig. 1;

20 Fig. 4 is a perspective view depicting the variant shown by Fig. 3 as viewed from below; and Fig. 5 is a sectional view taken along a line V-V in Fig. 3.

[0011] Details of a female member according to the invention as a component of a mechanical fastener will be more fully understood from the description given hereunder with reference to the accompanying drawings.

[0012] Figs. 1 and 2 are perspective views of a female member 1, depicting its top and bottom sides 2, 3, respectively. The female member 1 comprises a shaped component 1A made of a fibrous layer of thermoplastic synthetic fibers and strips 7 made from a thermoplastic synthetic resin. The shaped component 1A presents a so-called corrugated structure or the like. A plurality of ridges 4 shaped from the bottom side 3 toward the top side 2 extend in a direction as indicated by a double-headed arrow X and the ridges 4 are arranged intermittently in a direction as indicated by a double-headed arrow Y being orthogonal to the direction X. Each pair of

30 the adjacent ridges 4 are connected to each other by a flat portion 6. On the bottom side 3, a plurality of the strips 7 extending in the direction Y are arranged intermittently in the direction X. The strips 7 extend substantially in parallel one to another and heat-sealed or bonded by means of a gluing agent or an adhesive agent such as hot melt adhesive to the bottom side 3 at the flat portions 6.

[0013] To obtain the female member 1 of such a configuration, a fibrous layer such as a nonwoven fabric of thermoplastic synthetic staple fibers or continuous filaments which are entangled or melt-bonded with each other to be engageable with the male (hook) member, more preferably of crimped conjugated fibers, having a fineness of 0.5 ~ 15 d and a basis weight of 10 ~ 100 g/m² may be employed as the fibrous layer as material for the shaped component 1A. Each of the ridges 6 may have a height of 1 ~ 10 mm, more preferably of 2 ~ 5 mm as measured from the flat portion 6 to a crest 8

thereof and a width of 2 ~ 10 mm, more preferably of 3 ~ 7 mm as measured in the direction Y.

[0014] Each of the strips 7 as the other component of the female member 1 may have a width of 0.5 ~ 7 mm, more preferably of 1 ~ 5 mm and a thickness of 0.01 ~ 0.2 mm, more preferably of approximately 0.02 ~ 0.1 mm. Each pair of the adjacent strips 7 may be spaced from each other by 0.3 ~ 10 mm, more preferably by 0.5 ~ 5 mm. The strips 7 may be heat-sealed or bonded by means of a gluing agent or an adhesive agent such as hot melt adhesive to the bottom side of the shaped component 1A at the respective flat portions 6.

[0015] The female member 1 may be attached to an article with the bottom side 3 thereof being stitched to the article or bonded to the article by means of a gluing agent or an adhesive agent at said flat portions 6. With the female member 1 attached to the article in this way, a male member of the mechanical fastener is to be releasably engaged. The male member can be most reliably engaged with the ridges 4 of the female member 1. The shaped component 1A is effectively prevented from being stretched in the direction Y by the strips 7 bonded thereto since the strips 7 are arranged so as to be intermittent in the direction X and continuous in the direction Y. Accordingly, the ridges 4 can maintain their initial heights. On the other hand, the shaped component 1A is relatively flexible in the direction X as well as in the direction Y without being significantly restricted by the strips 7. In other words, the member 1 can follow a deformation of the article such as clothes and therefore does not deteriorate feeling to wear such article.

[0016] Figs. 3, 4 and 5 illustrate a variant of the female member according to the invention, in which Figs. 3 and 4 are perspective views similar to Figs. 1 and 2, and Fig. 5 is a sectional view taken along a line V-V in Fig. 3. According to this embodiment of the female member 1, the ridges 4 are arranged intermittently in the direction X as well as in the direction Y. Each of the ridges 4 has a length L of 2 mm or larger and each pair of the adjacent ridges 4 are spaced from each other by distances D₁, D₂ of 0 ~ 10 mm, more preferably of 2 ~ 7 mm. Each of the ridges 4 has a width W of 2 ~ 10 mm, more preferably of 3 ~ 7 mm. The strips 7 are dimensioned in the same manner as in the case illustrated by Fig. 2 and each of the strips 7 is assigned to each row along which the ridges 4 and the flat portions 6 are alternately arranged in the direction Y. The strips 7 assigned to the respective rows are designated by 7A, 7B, ..., 7E. It should be understood that some of the strips 7A ~ 7E, for example, the strips 7B and 7D may be eliminated without departing from the spirit and the effect of the invention. Specifically, the remaining strips 7A, 7C, 7E can sufficiently prevent the shaped component 1A from being stretched in the direction Y and thereby achieve the same effect as in the case of Fig. 1. The female member 1 according to this embodiment may further facilitate the male member to be engaged with the female member 1 than in the case illustrated by Fig. 1 since the ridges 4

are arranged intermittently in the direction X as well as in the direction Y.

[0017] The female member 1 according to the invention may be obtained, for example, by a method comprising the steps of thermo-embossing the nonwoven fabric of thermoplastic synthetic fibers to form the ridges 4 and the flat portions 6 and pressure-heat-sealing a plurality of the strips 7 discharged from an extruder against the bottom sides of the respective flat portions 6 before the strips 7 are hardened.

[0018] According to the important feature of the invention, the fibrous layer includes a plurality of the ridges arranged intermittently on its top side and a plurality of the thermoplastic synthetic resin strips intermittently bonded to the bottom side of the fibrous layer so as to be spaced one from another and to extend in parallel one to another. The ridges facilitate the male member to be engaged with the female member and the arrangement of the strips are effective to prevent the ridges from being deformed due to stretch of the shaped fibrous layer as well as from losing its initial flexibility. In this manner, the female member as one component of the mechanical fastener is relatively flexible and, when it is used with clothes, well follows deformation thereof without creating a feeling of discomfort against a wearer.

Claims

30. 1. A female member of a mechanical fastener consisting of a pair of male and female members adapted to be releasably engaged with each other, wherein:
said female member for engagement with said male member is formed by a fibrous layer of thermoplastic synthetic fibers and has top and bottom sides; a plurality of thermoplastic synthetic resin strips in strips are bonded to said bottom side of said fibrous layer so as to extend in parallel one to another in one direction; and a plurality of ridges are shaped from said bottom side toward said top side of said fibrous layer intermittently in said one direction so that said bottom side of said fibrous layer is spaced toward said top side of said fibrous layer from said strips.
35. 2. A female member according to Claim 1, wherein said ridges are arranged intermittently also in a direction orthogonal to said one direction.
40. 3. A female member according to Claim 1, wherein said ridges extend continuously in a direction orthogonal to said one direction.
45. 4. A female member according to Claim 1, wherein said fibrous layer is made of crimped conjugated fiber.
50. 5. A female member according to Claim 1 and 4,

wherein said fibrous layer presents a corrugated structure having said strips bonded to a bottom side thereof along respective trough-like portions thereof.

5

6. A female member according to Claim 1, wherein said fibrous layer is made of a nonwoven fabric.

10

15

20

25

30

35

40

45

50

55

FIG.1

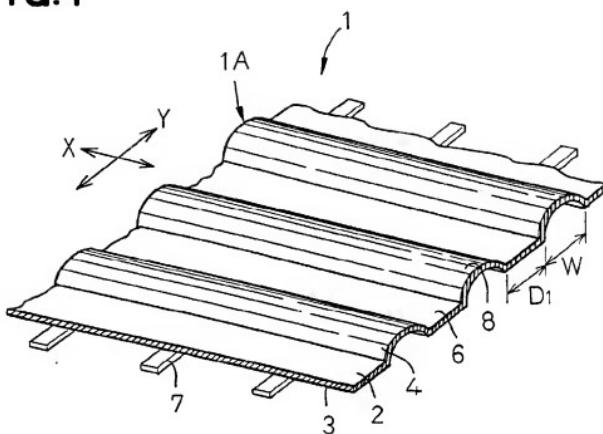


FIG.2

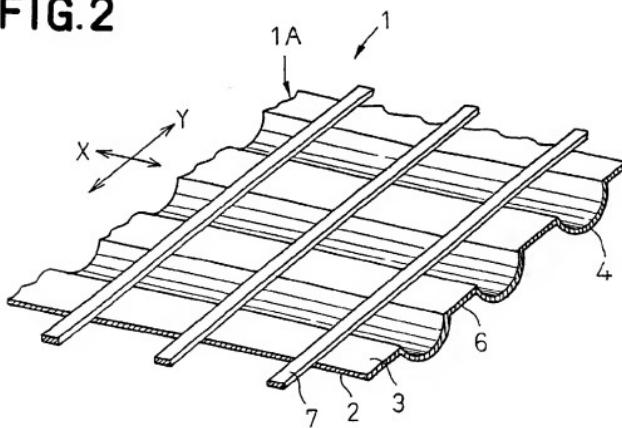


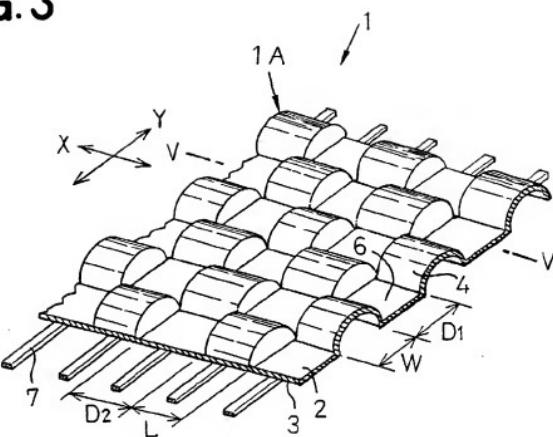
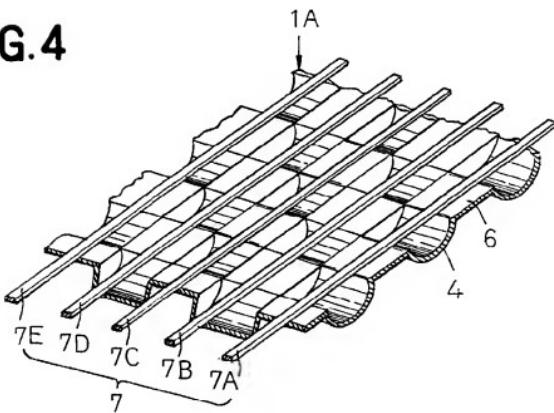
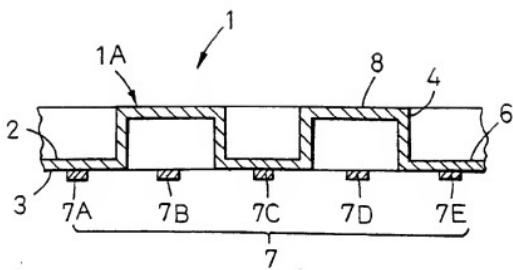
FIG.3**FIG.4**

FIG. 5



(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 913 104 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
29.09.1999 Bulletin 1999/39

(51) Int Cl.⁶ A44B 18/00

(43) Date of publication A2:
06.05.1999 Bulletin 1999/18

(21) Application number: 98308837.8

(22) Date of filing: 28.10.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 31.10.1997 JP 30085897

(71) Applicant: UNI-CHARM CORPORATION
Kawano-shi Ehime-ken (JP)

(72) Inventors:

- Tsuji, Tomoko,
c/o Research & Development Division
Mitoyo-gun, Kanagawa-ken, 769-1602 (JP)
- Takai, Hisashi, c/o Res. & Development Division
Mitoyo-gun, Kanagawa-ken, 769-1602 (JP)

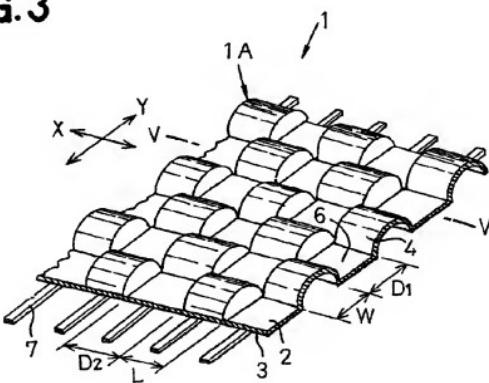
(74) Representative: Parry, Christopher Stephen
Saunders & Dolleymore,
9 Rickmansworth Road
Watford, Herts. WD1 7HE (GB)

(54) Female member of mechanical fastener

(57) A female member 1 of a mechanical fastener includes a fibrous layer and a plurality of strips 7. A plurality of ridges 4 are intermittently shaped from a bottom side 3 toward a top side 2 of the fibrous layer. A plurality of strips 7 are bonded to the bottom side 3 of the fibrous

layer so as to be spaced one from another and extend in parallel one to another in one direction so that the bottom side 3 of the fibrous layer is spaced toward the top side 2 of the fibrous layer from the respective strips along the respective ridges 4.

FIG.3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 30 8837

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	EP 0 341 993 A (MINNESOTA MINING AND MANUFACTURING COMPANY) 15 November 1989 (1989-11-15) * page 4, line 37 - line 56 * * page 6, line 6 - line 54; claim 1; figures 1-10 *	1,2
A	US 5 380 313 A (THE PROCTER & GAMBLE COMPANY) 10 January 1995 (1995-01-10) * column 3, line 29 - column 11, line 25 *	1,6
The present search report has been drawn up for all claims		
Place of search	Date of completion of the search	Examiner
THE HAGUE	2 August 1999	Garnier, F
CATEGORY OF CITED DOCUMENTS		
X : particularly relevant if taken alone	T : theory or principle underlying the invention	
Y : particularly relevant if combined with another	E : earlier patent document, but published on, or	
document of the same category	and later filed	
A : technological background	D : document cited in the application	
O : non-patent disclosure	L : document cited for other reasons	
P : intermediate document	& : member of the same patent family, corresponding	
EPO FORM 1609/03 (EP/04/07)		

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 8837

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-08-1999

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 341993	A	15-11-1989	AU	622171 B	02-04-1992
			AU	3378389 A	16-11-1989
			CA	1333952 A	17-01-1995
			DE	68908468 T	03-03-1994
			ES	2043010 T	16-12-1993
			JP	2018036 A	22-01-1990
			KR	9613457 B	05-10-1996
			MX	173200 B	08-02-1994
			US	5354591 A	11-10-1994
			US	5616394 A	01-04-1997
			US	5643397 A	01-07-1997
			US	5256231 A	26-10-1993
			US	5611791 A	18-03-1997
			US	5254194 A	19-10-1993
US 5380313	A	10-01-1995	US	4854984 A	08-08-1989
			AT	152965 T	15-05-1997
			AU	647398 B	24-03-1994
			AU	5907490 A	24-01-1991
			CA	2020731 A,C	20-01-1991
			DE	69030691 D	19-06-1997
			DE	69030691 T	11-09-1997
			DK	409315 T	15-12-1997
			EP	0409315 A	23-01-1991
			ES	2100865 T	01-07-1997
			GR	3024198 T	31-10-1997
			HK	1006556 A	05-03-1999
			IE	77634 B	31-12-1997
			JP	2781260 B	30-07-1998
			JP	3114832 A	16-05-1991
			PT	94744 A,B	20-03-1991
			US	H1558 H	02-07-1996
			AT	75658 T	15-05-1992
			AT	131438 T	15-12-1995
			AU	609830 B	09-05-1991
			AU	1817388 A	22-12-1988
			AU	636697 B	06-05-1993
			AU	6923891 A	21-03-1991
			CA	1310568 A	24-11-1992
			DE	3854789 D	25-01-1996
			DE	3854789 T	02-05-1996
			DE	3870721 A	11-06-1992
			DK	334388 A	20-12-1988
			EP	0295957 A	21-12-1988
			EP	0456281 A	13-11-1991
			ES	2080199 T	01-02-1996

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 8837

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-08-1999

Patent document cited in search report	Publication date	Patent family members)	Publication date
US 5380313 A		FI 882908 A,B, GR 3004503 T GR 3018426 T HK 46994 A HK 1007295 A IE 69650 B JP 1078821 A JP 2541629 B KR 9705625 B PH 25594 A PT 87774 A,B US 4919738 A	20-12-1988 28-04-1993 31-03-1996 20-05-1994 09-04-1999 02-10-1996 24-03-1989 09-10-1996 18-04-1997 08-08-1991 31-05-1989 24-04-1990